

CLAIMS

What is claimed is:

1. An apparatus for providing leak detection and reporting of different types of leaks, said apparatus for use within a reservoir of a toilet having an inlet valve with a refill tube assembly therein, said reservoir also having an overflow pipe and an opening in the reservoir for a flapper for controlling water flow from the reservoir, said apparatus comprising:

a timing module; and

a water flow sensor coupled to said timing module for sensing water flow, said timing module having a calibration mode for measuring a standard fill time required to properly fill the reservoir following a flush, said apparatus having a lower time threshold and an upper time threshold based upon said standard fill time, said apparatus activating a first alarm if a subsequent fill time is below said lower time threshold to identify a small leak, or activating a second alarm if another fill time is above said upper time threshold to identify a large leak, wherein different alarms may be activated in response to different types of leaks.

2. The apparatus of Claim 1 wherein said water flow sensor is adapted to detect leaks as a result of a leaking inlet valve as well as leaks between the flapper and the opening in the reservoir.

3. The apparatus of Claim 1 wherein said water flow sensor is configured to be received and retained within the overflow pipe.

4. The apparatus of Claim 1 wherein said water flow sensor is positioned adjacent to the exterior of the overflow pipe, and both said water flow sensor and the overflow pipe to receive water from the refill tube assembly.

5. The apparatus of Claim 1 wherein said small leak is between the flapper and the opening in the reservoir while the flapper in the opening is in a closed position.

6. The apparatus of Claim 1 wherein said large leak is between the flapper and the opening in the reservoir while the flapper is stuck in an open position.

7. The apparatus of Claim 1 wherein either of said leaks is from the inlet valve and the reservoir is filled beyond the level of the overflow pipe.

8. The apparatus of Claim 1 wherein said alarms are visual alarms.

9. The apparatus of Claim 1 wherein said alarms are audible alarms.

10. The apparatus of Claim 9 wherein said first alarm is shorter compared to said second alarm.

11. The apparatus of Claim 1 further comprising a sensor operable to detect when a lever for initiating water flow from a reservoir into a toilet bowl is activated such that said sensor indicates the initiation of a flush.

12. The apparatus of Claim 1 further comprising a remote device for receiving said alarms.

13. The apparatus of Claim 12 wherein said remote device is a wireless remote device.

14. In a toilet having an inlet valve, a refill tube assembly and an overflow pipe in a reservoir of the toilet, a water flow path through the reservoir of the toilet, said water flow path passing from the inlet valve to a refill tube assembly, at least a portion of said water flow path continuing from the refill tube assembly through a water flow sensor, said portion of said water flow path through said water flow sensor being substantially the same as a portion of said water flow path through the overflow pipe, such that water passing through said water flow sensor passes through at least a portion of the overflow pipe substantially simultaneously.

15. The water flow path of Claim 14 wherein said portion of said water flow path through said water flow sensor is concentric with said portion of said water flow path through the overflow pipe.

16. The water flow path of Claim 14 wherein said water flow sensor is adapted to detect leaks as a result of a leaky inlet valve as well as to detect leaks between a flapper and an opening in the reservoir.

17. In a reservoir of a toilet having an inlet valve with a refill tube assembly and an overflow pipe, a water flow path through the reservoir of the toilet, said water flow path passing from the inlet valve to a refill tube assembly, a portion of said water flow path continuing from the refill tube assembly through a water flow sensor, and a remaining portion of said water flow path continuing from the refill tube assembly through the overflow pipe, wherein said portion of said water flow path through said water flow sensor is displaced from said remaining portion of said water flow path passing through the overflow pipe.

18. The water flow path of Claim 17 wherein said water flow sensor is adapted to detecting leaking inlet valves as well as leaks between a flapper and an opening in the reservoir.

19. An apparatus for providing leak detection and reporting of different types of leaks, said apparatus comprising:

a timing module; and

a water flow sensor coupled to said timing module for sensing water flow, said timing module capable of measuring a standard fill time required to properly fill a reservoir, said apparatus having a lower time threshold and

an upper time threshold based upon said standard fill time, said apparatus activating a first alarm if a subsequent fill time is below said lower time threshold to identify a small leak, or activating a second alarm if a subsequent fill time is above said upper time threshold to identify a larger leak, wherein different alarms are activated in response to different types of leaks.

20. The apparatus of Claim 19 wherein said water flow sensor is adapted to detect leaks at the inlet valve as well as leaks between a flapper and an opening in the reservoir.

21. The apparatus of Claim 19 wherein said water flow sensor measures water flow from a refill tube assembly within a reservoir of a toilet.

22. A method for providing leak detection and reporting comprising the following steps:

calculating a standard fill time for filling a toilet reservoir with water;

calculating a lower time threshold and an upper time threshold based upon said standard fill time;

activating a first alarm when a subsequent fill time is below said lower time threshold to identify a slow leak; or

activating a second alarm if a subsequent fill time is above said upper time threshold to identify a faster leak, wherein different alarms may be activated in response to different types of leaks.

23. The method of Claim 22 wherein either of said activating steps is performed as a result of detecting a leaking inlet valve or a leak between a flapper in an opening in the reservoir.

24. The method of Claim 22 wherein water passes through a water flow sensor to perform said step of calculating said standard fill time.

25. The method of Claim 22 wherein water contacts a water flow sensor to perform said step of calculating said standard fill time.

26. The method of Claim 22 wherein said step of calculating said standard fill time is performed by measuring water flow through at least a portion of an overflow pipe in a reservoir of a toilet.

27. The method of Claim 22 wherein said step of calculating said standard fill time is performed by measuring water flow from a refill tube assembly which passes through at least a portion of an overflow pipe in a reservoir of a toilet.

28. The method of Claim 22 wherein said step of calculating said standard fill time is performed by measuring water flow from a refill tube assembly in a reservoir of a toilet.

29. The method of Claim 22 further comprising the step of sending said alarms to a remote device.

30. The method of Claim 22 further comprising the step of providing a resistance threshold for comparison with a resistance measured between a pair of contacts in order to determine when water flow exists in a water flow sensor having said contacts.

31. The method of Claim 30 wherein said resistance measured between said contacts must exceed said resistance threshold to indicate water flow through said water flow sensor.

32. The method of Claim 30 wherein said resistance measured between said contacts must be below said resistance threshold to indicate water flow through said water flow sensor.

33. A water flow sensor comprising:
an elongated tube having an opening extending therethrough for receiving water; and
a pair of elongated contacts coupled to said elongated tube and extending across said opening in said tube.

34. The water flow sensor of Claim 33 wherein said elongated contacts extend across said opening in said tube in substantially a diagonal manner relative said opening.

35. The water flow sensor of Claim 33 wherein said elongated contacts extend across said opening in substantially opposite directions relative to each other.

36. The water flow sensor of Claim 33 wherein distal ends of each of said elongated contacts outwardly extend from an end of said tube to detachably secure said water flow sensor to an overflow pipe within a reservoir of a toilet.

37. The water flow sensor of Claim 36 wherein said distal ends of each said elongated contact is configured to extend from the inside of said overflow pipe to the exterior of said overflow pipe.

38. The water flow sensor of Claim 37 wherein each said distal end is bent back onto itself such that said distal ends permit said water flow sensor to be secured over the top of an overflow pipe in a hook-like manner.